IN THE CLAIMS:

Please enter the following amended claims:

1. (Amended) An optical filtering system comprising:

a first optical element adapted to receive an original image requiring filtering;

a second optical element positioned relative to said first optical element to define an optical region therebetween, said optical region comprising a Fourier transform plane and an optical region outside said Fourier transform plane; and

a positive-definite optical transfer function element having a plurality of non-zero transmission amplitude values positioned within said optical region outside said Fourier transform plane, wherein said positive-definite optical transfer function element introduces a non-positive-definite transfer function on said original image to produce a modified image.

2. (Original) The system according to claim 1, wherein an amplitude distribution of said positive-definite optical transfer function element is determined by the position of said positive-definite optical transfer function element relative to said first and second optical elements.

3. (Original) The system according to claim 1, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined by a range of complex-valued transfer functions induced by said optical region outside said Fourier transform plane.

4. (Original) The system according to claim 1, wherein an amplitude distribution of said positive-definite optical transfer function element is determined using Hermite function expansions.

5. (Original) The system according to claim 1, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined using Hermite function expansions.

6. (Original) The system according to claim 1, wherein an amplitude distribution of said positive-definite optical transfer function element is determined using approximations.

7. (Original) The system according to claim 1, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined using approximations.

8. (Original) The system according to claim 1, wherein said positive-definite optical transfer function element comprises a controllable optical modulator.

9. (Original) The system according to claim 8, wherein said controllable optical light modulator is controlled by control signals.

10. (Original) The system according to claim 1, wherein said original image comprises data, and wherein optical computations of said data are accomplished by said positive-definite optical transfer function element introducing said non-positive-definite transfer function on said data.

11. (Original) The system according to claim 10, wherein said optical computations comprise complex-valued arithmetic.

12. (Original) The system according to claim 1, wherein said first optical element comprises a lens or graded-index optical medium.

13. (Original) The system according to claim 1, wherein said second optical element comprises a lens or graded-index optical medium.

14. (Amended) The system according to claim 1, wherein said first optical element, said second optical element, and said positive-definite optical transfer function element comprise a monolithic ~~an integrated~~ optics device.

15. (Original) The system according to claim 1, wherein said first optical element, said second optical element, and said positive-definite optical transfer function element comprise a monolithic, integrated optics device.

16. (Original) The system according to claim 1, wherein said original image comprises light.

17. (Original) The system according to claim 1, wherein said original image comprises a particle beam.

18. (Original) The system according to claim 1, said system further comprising:

a plurality of positive-definite optical transfer function elements positioned within said optical region outside said Fourier transform plane, wherein each of said plurality of positive-definite optical transfer function elements introduce a non-positive-definite transfer function on said original image.

19. (Original) The system according to claim 1, said system further comprising:

an image source adapted to generate said original image; and

an observation element adapted to receive said modified image.

20. (Original) The system according to claim 19, wherein said image source comprises an optoelectric transducer.

21. (Original) The system according to claim 19, wherein said observation element comprises an optoelectric transducer.

22. (Amended) An optical filtering method comprising:

receiving an original image requiring filtering at a first optical element;

positioning a second optical element relative to said first optical element to define an optical region therebetween, said optical region comprising a Fourier transform plane and an optical region outside said Fourier transform plane; ~~and~~

selecting a positive-definite optical transfer function element based upon which non-positive-definite transfer function is to be applied to said original image; and

~~positioning a~~ positioning said selected positive-definite optical transfer function element within said optical region outside said Fourier transform plane, wherein said positive-definite optical transfer function element introduces a non-positive-definite transfer function on said original image to produce a modified image.

23. (Original) The method according to claim 22, wherein an amplitude distribution of said positive-definite optical transfer function element is determined by the position of said positive-definite optical transfer function element relative to said first and second optical elements.

24. (Original) The method according to claim 22, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined by a range of complex-valued transfer functions induced by said optical region outside said Fourier transform plane.

25. (Original) The method according to claim 22, wherein an amplitude distribution of said positive-definite optical transfer function element is determined using Hermite function expansions.

26. (Original) The method according to claim 22, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined using Hermite function expansions.

27. (Original) The method according to claim 22, wherein an amplitude distribution of said positive-definite optical transfer function element is determined using approximations.

28. (Original) The method according to claim 22, wherein the position of said positive-definite optical transfer function element, relative to said first and second optical elements, is determined using approximations.

29. (Original) The method according to claim 22, wherein said positive-definite optical transfer function element comprises a controllable optical modulator.

30. (Original) The method according to claim 29, wherein said controllable optical modulator is controlled by control signals.

31. (Original) The method according to claim 22, wherein said original image comprises data, and wherein optical computations of said data are accomplished by said positive-definite optical transfer function element introducing said non-positive-definite transfer function on said data.

32. (Original) The method according to claim 31, wherein said optical computations comprise complex-valued arithmetic.

33. (Original) The method according to claim 22, wherein said first optical element comprises a lens or graded-index optical medium.

34. (Original) The method according to claim 22, wherein said second optical element comprises a lens or graded-index optical medium.

35. (Amended) The method according to claim 22, wherein said first optical element, said second optical element, and said positive-definite optical transfer function element comprise a monolithic ~~an integrated~~ optics device.

36. (Original) The method according to claim 22, wherein said first optical element, said second optical element, and said positive-definite optical transfer function element comprise a monolithic, integrated optics device.

37. (Original) The method according to claim 22, wherein said original image comprises light.

38. (Original) The method according to claim 22, wherein said original image comprises a particle beam.

39. (Amended) The method according to claim 22, said method further comprising:

selecting a plurality of positive-definite optical transfer function elements based upon which non-positive-definite transfer function is to be applied to said original image; and

positioning said selected plurality ~~a plurality~~ of positive-definite optical transfer function elements ~~positioned~~ within said optical region outside said Fourier transform plane, wherein each of said plurality of positive-definite optical transfer function elements introduce a non-positive-definite transfer function on said original image.

40. (Amended) The method according to claim 22, said method further comprising:

adapting an image source ~~adapted~~ to generate said original image; and

adapting an observation element ~~adapted~~ to receive said modified image.

41. (Original) The method according to claim 40, wherein said image source comprises an optoelectric transducer.

42. (Original) The method according to claim 40, wherein said observation element comprises an optoelectric transducer.

43. (Amended) An optical filtering method comprising:

receiving an original image requiring filtering at a first optical element;

inducing a Fourier transform plane within an optical region defined by a second optical element positioned relative to said first optical element, said optical region comprising said Fourier transform plane and a region outside said Fourier transform plane; ~~and~~

selecting a positive-definite optical transfer function element based upon which non-positive-definite transfer function is to be applied to said original image; and

introducing a non-positive-definite transfer function on said original image using said selected ~~using a~~ positive-definite optical transfer function element positioned within said region outside said Fourier transform plane, wherein said introducing of said non-positive-definite transfer function results in a filtered image of said original image.